NATIONAL BURN SEVERITY MAPPING PROJECT[1]

Using satellite and field data to understand fire's effect on the landscape

http://burnseverity.cr.usgs.gov

STEPS FOR COMPLETING BURN SEVERITY ASSESSMENT REQUESTS FOR 2003 AND 2004 FIRES

Overview

NPS units in which a single fire exceeded 300 acres, or multiple fires exceeded 500 acres, during either 2003 or 2004 should consider requesting an assessment of burn severity. An on-line request form has been developed to facilitate this process (described in detail in step 2 below).

Request Deadlines:

- For 2003 fires, all requests should be completed by July 1, 2004.
- For 2004 fires, submit requests as soon as possible after the fire is declared out or is no longer growing significantly.

Park and cluster level fire ecologists should lead the requesting process by filling out the on-line request form with input from fire management staff (e.g. collateral duty FMO's) and GIS specialists.

Burn Severity Assessment Types

Requests may include Extended Assessments, Initial Assessments, or both. Please review the descriptions below to determine which is appropriate for your area.

- *Extended Assessment (EA)*: Generally completed on all large burns. Post-fire Landsat scenes are acquired during the first growing season after the fire. Timing varies with geographic region; it may be 8-11 months post fire in the northwest, while only 1-4 months post fire in the southeast. The EA provides a final complete view of the burn, including the ability to capture delayed mortality and survivorship of burned vegetation. For this reason, it tends to be a better indicator of severity than the Initial Assessment by offering a means to evaluate the full range of first-order ecological effects. In most cases, it also provides a good delineation of the burned area and fire perimeter. By waiting until the next growing season, the opportunity to acquire optimal remote sensing data is also

[1] We define burn severity as the degree of environmental change caused by fire, the effect of fire on ecological communities comprising the landscape. The focus is on meso-scale first-order fire effects, incorporating all spatial variability averaged within a 30-meter pixel, and compositing effects over all ecological strata of the area. GIS and statistical products of this program delineate the final fire perimeter and provide information on the whole burn and large regions of burning that is more thorough than any other tool currently used by federal land management agencies. The data helps to define lasting impacts and environmental responses from fire, and to prepare for long-term management of burned areas. Because many fires cannot be closely monitored while active, post-fire evaluations also yield insight into fire behavior across varying topography and vegetation, thus contributing to basic research and modeling.

greater than with Initial Assessments. The EA is important for long-term management, ecological understanding and study of burns.

- *Initial Assessment (IA)*: The IA is generally done within one week to two months after fire. It *may* fall within the timeframe of rapid response by BAER teams. There are two triggers for IA: 1) when the fire stops growing significantly, or preferably when the fire is completely out, and 2) when acceptable Landsat data is available. Because of data timing and quality issues, it may not be possible to do an IA on all burns. The IA usually cannot capture both delayed mortality and regrowth or survivorship of burned vegetation especially in western coniferous systems. Thus, IA normally misses some important factors for gauging burn severity, and may tend to over estimate severity. Moreover, in some cases, the fire may still be active after the last Landsat scene suitable for IA, so the IA may not show the final area or composition of the burn. Depending on how late in the year burning concludes, snow and low sun angles may also reduce the quality of results.

STEP 1: Determine the Type of Burn Severity Assessment Needed

Extended Assessments are recommended in all cases with the following exceptions:

- All of the burn occurs within ecotypes that respond quickly after fire, and first-order effects are ephemeral. This includes many grasslands, mesic shrub and herbaceous communities. Often in these cases, just knowing whether or not an area burned is sufficient, because severity is uniformly low and homogeneous. We can review available post-fire data in these cases to help determine whether it would be productive to proceed with an EA.
- The burn is small (<300 acres), and it did not produce sufficient area representing a range of effects, e.g. it was mostly low to moderate severity. Such burns may be more cost effectively characterized by other means.

Initial Assessments may be warranted under one or more of the following conditions:

- The burn is large and has significant socio-economic impacts, or when there is an urgent need for public information and/or emergency response.
- Significant portions of the burn occur within ecotypes that respond quickly after fire, or where first-order effects are ephemeral, as in many grasslands, or mesic shrub and herbaceous communities.
- The burn is in deciduous forest and/or it is a fall burn after leaves have fallen, such that, the next season's growth is likely to completely obscure the burn.
- The burn is the subject of study, with objectives to compare burn responses over time.

Both Initial and Extended Assessments may be useful in some circumstances for full information on the extent and composition of burns:

- Low severity fires that occur in high-density, closed-canopy forest (deciduous or coniferous), to better delineate the burn scar as well as the severity mosaic.
- Where burns are exceedingly complex involving several different ecotypes, again, using the IA to distinguish burned and unburned areas, and to delineate the perimeter, while capturing additional burn severity information with the EA.
- If there is uncertainty about the need for either an IA or EA, seek assistance through the contact information on the web site. It is possible, for example, to complete the EA and then determine the need for an IA after looking at the results. Since all Landsat scenes are archived, the ability always exists to go back and complete any assessment type at a later date.

Additional Guidelines:

- For most solitary fires, only burns greater than 300 acres should be mapped. Smaller fires can be mapped when there is solid justification.
- A Landsat scene covers 180x180 km, and all fires within that scene will be captured, so there is no need to submit multiple requests for all fires covered within the same scene area and timeframe. Complete a request for the largest fire, and make note of the additional fires on the form.
- EA can effectively map burn severity in forest or shrub communities when burns are mixed severity and greater than 100 acres. However, when fires are low severity and/or homogeneous in those communities, consider an assessment only when fires are greater than 500 acres.
- In grasslands or other communities where first-order effects are short lived, consider burn severity assessments only when a fire is greater than 500 acres. When fire effects are ephemeral, an IA may provide all the information necessary to capture the burn and unburned mosaic. An EA may not contribute much about severity, except perhaps that productivity was actually enhanced by the fire.
- There often are unique circumstances and uncertainties about completing a burn severity assessment. Feel free to contact Nate Benson with any questions about the need or type of assessment.

STEP 2: Complete On-line Request for Burn Severity Assessment:

1. Go to http://burnseverity.cr.usgs.gov/fire_main.asp
2. Click on "Request Data"
3. Click "NPS Burn Severity Mapping Requests"
4. Fill out form:
   - Under "Type of Analysis" enter the assessment type. The options are Extended, Initial, or Both. Your default selection should not be "both". If you request an Initial or both (initial and extended assessment), you will need to write a brief justification on why the IA is needed.
   - Make sure to list smaller secondary fires in the request. Burn severity assessments can detect fires that are around ten acres; if these fires are included in the request, USGS EROS Data Center (EDC) will map their perimeters when feasible. Also, inclusion of these fires may influence what pre and post fire scenes that EDC selects for the assessment.
   - If there is urgency, please state that in the comment section of the request form and we will try to complete the assessment as soon as EDC acquires acceptable Landsat scenes.

Timeframe and Products

Once the request is submitted, EDC will begin selecting and processing Landsat data. Scene selection for extended assessment depends on when green up occurs and in high elevation fires this may not happen until late summer. For extended assessment there is usually no urgency in completing the assessment, however, we will try to have most assessments completed by fall.

When the assessment has been completed, EDC will post the results on the National Burn Severity Mapping Project website under the *Data Archive* link, and will send the primary contact person, identified in the on-line request form, 3 cds:

- One cd will have an ArcView project with a full Landsat scene dNBR, a rescaled first draft of burn severity classes, the fire perimeter, and metadata.
- The other two cds will have the pre and post fire Landsat scenes in the park's designated projections and in the Geo-tiff format. (see *Data Contents* link for further details)

If you have any questions regarding completion of the burn severity assessment request form, or what type of assessment to request, contact the USGS EROS Data Center or Nate Benson:

- Stephen Howard, EDC, 605-594-6027, smhoward@usgs.gov
- Don Ohlen, EDC, 605-594-6026, ohlen@usgs.gov
- Nate Benson, NPS, 208-387-5223, nate_benson@nps.gov

NPS 2003 Fire Information

2003 total number of fires and acres burned by park unit based on SACS data from January 2004. Parks needed a minimum of 400 acres burned to be included on the list.

REGION	NPS Unit Name	Number of Fires	Total Acres	Contacts
AKRO	Western Arctic	5	2060	Jennifer Allen/Brian Sorbel
IMRO	Glacier	15	223029	Dennis Divoky
	Grand Canyon	19	32468	Leonard/Gdula
	Yellowstone	10	25344	Eric Miller/Ann Rodman
	Lake Meredith	8	6577	Trader/Fisher
	Saguaro	3	3620	Ecologist position is vacant
	Grand Teton	9	2821	Abendroth/Shupe
	Mesa Verde	4	2764	Bastian
	El Malpais	6	1710	Trader
	Big Thicket	7	768	Jeansomme
	Chickasaw	4	603	Jeansomme
	Big Bend	5	572	Gatewood
	Zion	8	455	Bastian
MWRO	Tallgrass Prairie	1	8700	Decoster
	Buffalo	12	2227	Luraas
	Ozark	6	1955	Luraas
	Indiana Dunes	17	1291	Mulconrey/Decoster Ecologist position is vacant
	Theodore Roosevelt	4	542	Weink
PWRO	Sequoia-Kings Canyon	25	16434	Caprio/Folger
	Yosemite	28	13008	Paintner/Grupe
	Hawaii Volcanoes	6	7119	Reeberg
	North Cascades	10	3651	Kopper
	Lake Mead	4	2026	Reeberg
	Lava Beds	4	1451	Rasmussen
	Whiskeytown	5	1146	Bradley
	Redwood	10	834	Bradley
	Olympic	1	820	Kopper
	Mount Rainier	5	396	Reeberg
SERO	Big Cypress	33	33507	Hovorka
	Everglades	35	26518	Hernandez/Loveland
	Great Smokey Mountains	7	1476	Klein
	Big South Fork	2	520	Klein
	Mammoth Cave	1	408	McInnis